WHAT IS CLAIMED IS:

1. A piston pump for propelling liquid through a lumen of a flexible tube segment, the pump comprising:

a first tube-clamping member;

a first set of tube squeezing members;

a second tube-clamping member;

a second set of tube squeezing members, said members arranged in a direction from upstream to downstream;

a motor; and

a synchronizing device operably associated with the motor and said members, the synchronizing device operable to activate said members in a sequential order such that fluid in the tube is displaced in a downstream direction.

2. The piston pump of claim 1, further comprising a disposal flow set comprising a drip chamber, a valve, and a flexible tube including at least one squeezing segment defining two ends, wherein each end of the at least one squeezing segment is associated with a stopper.

3. A piston pump of claim 2 wherein the sequential activating order comprises:

activating said second tube clamping member into blocking the lumen of a tube of said flow set tube and said first tube clamping member to open the lumen of said tube of said flow set tube;

activating said second set of tube squeezing members to constrict a respective tube portion and said first set of tube squeezing members to allow expansion of said respective tube portion;

activating said first tube clamping member into blocking said tube's lumen;

activating said second clamping member to open said tube's lumen, and said second set of tube squeezing members to allow expansion of said respective tube portion; and

activating said first set of tube squeezing members to constrict said respective tube portion.

4. The piston pump of claim 3 wherein the pressing surface of said squeezing members is designed for designed squeezing.

5. The piston pump of claim 3 wherein the squeezing area of said first set of squeezing members is about twice of the area of said second set of squeezing members.

6. The piston pump of claim 3 wherein the synchronizing device comprises an axis and a number of eccentric cams operably associated with the axis, a cam for each said clamping or squeezing member, for moving said members up and down.

7. The piston pump of claim 6 wherein the motor is operable to revolve said synchronizing device.

8. The piston pump of claim 1, further comprising an ultrasonic sensor operably associated with the flexible tube segment for detecting air in the liquid.

9. The piston pump of claim 1, further comprising a communication device operable to use any communication infrastructure for delivering information and receiving commands.

10. The piston pump of claim 2, further comprising a dripping sensor for sensing and counting the drips passing through said dripping chamber.

11. The piston pump of claim 2, further comprising a sensor unit adapted for determining the pressure of a liquid flowing within said flexible tube.

12. The piston pump of claim 11 wherein the sensor unit defines a tube receiving space formed by walls engaging at least a portion of said tube and comprises a sensing member projecting into the space for determining deformation-resistance of said tube.

13. The piston pump of claim 12 wherein said sensing member comprises a plunger associated with a strain gage and said receiving space is defined by a rectangular shape and said plunger projects through one of the walls of said tube.

14. The piston pump of claim 7 wherein said motor is revolved by a controller into a nonlinear revolution to achieve linear flow of liquid, by using an algorithm for revolving a motor in a specific nonlinear revolution, comprising:

the motor revolution is divided into a number of steps;

a controller rotates said motor, sequentially from first step to the last step of each revolution, wherein each step or a group of steps has an individual speed and an individual pause time between steps or a group of steps;

the liquid flow, in the output of the pump, is measured in each said step and in each said pause;

calculating or changing the speed of each said step and duration of each said pause, to have the desired flow function; and

storing the function of the nonlinear revolution of said motor, in a memory.

15. The piston pump of claim 13, wherein said algorithm is used sequentially during said pump work.

16. The piston pump of claim 15 wherein said algorithm is used for calibration to obtain said function of nonlinear revolution and said controller uses the obtained function to revolve said motor in further work.

17. A method for controlling a pump in which a flexible tube is disposed for delivery of a liquid, comprising:

activating a second tube-clamping member into blocking a lumen of the tube and a first tube-clamping member to open the lumen of the tube;

activating a second set of tube squeezing members to constrict a second portion of the tube and a first set of tube squeezing members to allow expansion of a first portion of the tube;

activating the first tube-clamping member into blocking the lumen of the tube;

activating the second clamping member to open the lumen of the tube, and the second set of tube squeezing members to allow expansion of the second portion of the tube; and

activating the first set of tube squeezing members to constrict the first portion of the tube.

18. An injection apparatus comprising, in combination, a pump for pumping liquid through a lumen of a flexible tube;

wherein the pump comprises:

a motor;

a first tube-clamping member;

a first set of tube squeezing members;

a second tube-clamping member;

a second set of tube squeezing members, said members arranged in a direction from upstream to downstream; and

a synchronizing device operably associated with the motor and said members, the synchronizing device operable to activate said members in a sequential order such that fluid in the tube is displaced in a downstream direction; and

wherein the flexible tube comprises:

a drip chamber;

a valve; and

at least one squeezing segment defining two ends, wherein each end of the at least one squeezing segment is associated with a stopper.